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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,388	06/01/2007	Masanobu Kawazoe	DK-US065246	9309

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EXAMINER	
VAN OUDENAREN, SARAH A	
ART UNIT	PAPER NUMBER
1793	
MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,388	KAWAZOE ET AL.	
	Examiner	Art Unit	
	SARAH VAN OUDENAREN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *9/27/2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5, 9, 10, 11, 14, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al (US 5,462,817) in view of Yoichi et al (JP 2003-059521).

Hsu teaches a high temperature electrochemical converter and specifically related to high performance systems employing such devices. Hsu teaches that electrochemical converters perform fuel-to-electricity conversions in a fuel cell (col 1, lines 15-25). The system facilitates the heat transfer from the fuel cell stacks (col 2 line 5-10) and is typically used in systems with operating temperatures around 1000°C (col 1, lines30-40). Hsu teaches fuel and oxidizers being supplied to the stack (col 5, lines 20-50) as well as using solid oxide material (col 5, lines 50-65). A burner is used to burn the spent gases from the converter within the thermal enclosure to provide additional energy (col 8, lines 1-10, Figure 7). Hsu teaches two loops within the system. The first loop acting as a fuel cell loop performs reactant processing, thermal regeneration, and fuel cell operations. The second loop includes the heat transfer elements. The mass flow rate of the working medium is regulated to a level which can absorb the radiatively transferred waste heat from the fuel cell stack and achieve a large temperature rise which is favorable from a thermodynamic efficiency standpoint (col 8, lines 20-65).

Hsu does not explicitly teach a branching part.

Yoichi teaches a SOFC wherein a bypass line may be used when the temperature of the oxidizing agent heated by the recuperator is higher than the temperature which the SOFC needs, said bypass line can lower the temperature of the oxidizing agent (see figure 8 and paragraph 63). Lines 18 and 10 are considered to be the two flow paths as seen in figure 8. Further as the bypass line 18 of Yoichi utilized fluid that is from a heat exchanger, 9, examiner considers that line 18 indeed does supply fluid to the cell, through the heat exchanger. Alternatively, the line 10, from which line 18 branches off of, is considered to supply fluid to the cell through the heat exchanger.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the branching of Yoichi with the system of Hsu as it is clearly known in the art that passages diverging from the heat recovery passage are provided for optimizing the temperature of a reaction gas fed to the fuel cell based on the temperature of the fuel cell.

Examiner maintains that the heat recovery path is disposed around the cell module as reflected in the claim language. The cell module is claimed as including the stack and a burning section, but it is not limited to only those components. As such, examiner considers the heat recovery path of Yoichi to be disposed around the module. Alternatively, examiner considers such an arrangement to have been obvious to one of ordinary skill in the art at the time of the invention as a design choice.

Regarding claim 2, Hsu does not explicitly teach a branching part.

Yoichi teaches a SOFC wherein a bypass line may be used when the temperature of the oxidizing agent heated by the recuperator is higher than the temperature which the SOFC needs, said bypass line can lower the temperature of the oxidizing agent (see figure 8 and paragraph 63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the branching of Yoichi with the system of Hsu as it is clearly known in the art that passages diverging from the heat recovery passage are provided for optimizing the temperature of a reaction gas fed to the fuel cell based on the temperature of the fuel cell. It is seen in Yoichi that the diverging is done as a response to conditions of the SOFC and a ratio is affected.

Regarding claims 3 and 9, Hsu teaches that radiation heat transfer helps to maintain a uniform temperature distribution over the cell stack (col 5, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to facilitate the heat transfer loop across a plurality of layers in order to maintain a uniform temperature distribution.

Regarding claims 4, 10, and 14, Hsu teaches a burner is used to burn the spent gases from the converter within the thermal enclosure to provide additional energy (col 8, lines 1-10, Figure 7). Hsu teaches that maximizing the heat exchange between the incoming and outgoing gases would decrease the amount of heat lost by the system, thereby improving the overall system efficiency (col 6, lines 30-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to exchange heat

with the burned waste gas in order to decrease the amount of heat lost by the system, thereby improving the overall system efficiency.

Regarding claims 5, 11, and 15, Hsu teaches a burner is used to burn the spent gases from the converter within the thermal enclosure to provide additional energy (col 8, lines 1-10, Figure 7). It would have been obvious to one of ordinary skill in the art at the time of the invention to include this within the cell in order to decrease heat loss and maximize radiant heating.

Regarding claim 8, Hsu teaches a system as discussed above. Hsu teaches that the medium can be water, steam, gas or a variety of two-phase fluids (col 5, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to manipulate the gas in order to further control the heat exchange while utilizing a more inexpensive component of the system.

Claims 6-7, 12-13, 16-17, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al (US 5,462,817) in view of Yoichi et al (JP 2003-059521) as applied to claim 1 above and further as modified by Sato et al (US 2004/0062961).

Regarding claims 6, 12, 16, 18 Hsu teaches a high temperature electrochemical converter and specifically related to high performance systems employing such devices as discussed above. Hsu teaches a fuel supply being fed via heat exchangers wherein heat is exchanged and generates steam from water (col 7, lines 55- col 8, line 10).

Hsu does not explicitly teach a vaporizer.

Sato teaches a vaporizer configured to vaporize the fuel of a fuel cell system. The fuel containing liquid, such as water, is vaporized by being heated and becomes gas fuel with a certain composition (pg 2, paragraph 28). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the vaporizer of Sato with the system of Hsu in order to obtain a gas fuel with a certain composition. Sato teaches the vaporizer is under a thermal insulator and among other components of the system within a module in order to promote thermal efficiency. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the proximity of Sato with the system of Hsu in order to promote thermal efficiency.

Regarding claims 7, 13, 17, and 19 Sato teaches the vaporizer is under a thermal insulator and among other components of the system within a module in order to promote thermal efficiency. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the proximity of Sato with the system of Hsu in order to promote thermal efficiency.

Response to Arguments

Applicant's arguments filed 3/10/2010 have been fully considered. Currently the pending claims are 1-7 and 9-19.

Applicant argues that Yoichi does not disclose the first flow path as instantly claimed because Yoichi does not supply the supplied fluid to the cell stack through the heat exchanger. However, as discussed above, lines 18 and 10 are considered to be the two flow paths as seen in figure 8. Further as the bypass line 18 of Yoichi utilized

fluid that is from a heat exchanger, 9, examiner considers that line 18 indeed does supply fluid to the cell, through the heat exchanger. Alternatively, the line 10, from which line 18 branches off of, is considered to supply fluid to the cell through the heat exchanger.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the branching of Yoichi with the system of Hsu as it is clearly known in the art that passages diverging from the heat recovery passage are provided for optimizing the temperature of a reaction gas fed to the fuel cell based on the temperature of the fuel cell.

Further, applicant argues that Yoichi does not teach the heat recovery path being disposed around the cell stack. While examiner agrees that such a teaching is not explicit in Yoichi, examiner maintains that the heat recovery path is disposed around the cell module as reflected in the claim language. The cell module is claimed as including the stack and a burning section, but it is not limited to only those components. As such, examiner considers the heat recovery path of Yoichi to be disposed around the module. Alternatively, examiner considers such an arrangement to have been obvious to one of ordinary skill in the art at the time of the invention as a design choice.

Applicant argues that Yoichi does not disclose heat exchange occurring between a fluid supplied to the fuel cell stack and the stack itself prior to the fluid being supplied to the stack. However, such a limitation is not reflected in the instant claim language. Examiner considers the limitation applicant is referring to, to be "said heat recovery path being connected to said cell stack to supply said fluid from said second branch flow path

to said cell stack after recovering heat loss from said cell module" (lines 18-21 of claim 1). Examiner does not consider this limitation to reflect applicant's arguments as the limitation merely requires heat loss recovery prior to supply to the cell. As Yoichi teaches the bypass line being used to modify and obtain a usable temperature of the oxidizing agent, this is considered by examiner to include recovery of heat loss.

Applicant argues that Hsu is improperly modified because the two loops do not in fact share a working medium. While this is acknowledged, such a limitation is not required by the claim language, nor was such a limitation relied upon by examiner to justify modification. The two loops of Hsu are utilized to obtain heat transfer between the two loops wherein the working medium is regulated based on the heat loss of the fuel cell stack in order to achieve thermodynamic efficiency (col 8, lines 55-65 and figure 8). Examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the branching of Yoichi with the system of Hsu as it is clearly known in the art that passages diverging from the heat recovery passage are provided for optimizing the temperature of a reaction gas fed to the fuel cell based on the temperature of the fuel cell.

Applicant further argues that Hsu does not teach a heat recovery path disposed around said module that recovers heat loss from said module. Examiner disagrees insofar as Hsu clearly teaches two loops which function primarily to recover heat lost from the cell stack as in figures 8 and 9. As these are both within the vicinity of the module, they are considered to be “around” the module. As previously discussed above, the module is only required to include the stack and is not limited to the stack.

Applicant argues that examiner alleges that Sato discloses a vaporizer and does not assert that Sato discloses a branch flow regulation part branching said supply fluid to the first and second flow paths as now claimed. Examiner is not intending to rely upon Sato for a branching part, rather only for Sato's teaching of a vaporizer. Examiner maintains that it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the vaporizer of Sato with the system of Hsu in order to obtain a gas fuel with a certain composition. Sato teaches the vaporizer is under a thermal insulator and among other components of the system within a module in order to promote thermal efficiency. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the proximity of Sato with the system of Hsu in order to promote thermal efficiency.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH VAN OUDENAREN whose telephone number is (571)270-5838. The examiner can normally be reached on Monday-Thursday, 9:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SARAH VAN OUDENAREN/
Examiner, Art Unit 1793
May 26, 2010

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793